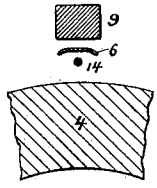
(No Model.) 2 Sheets—Sheet 1.

G. W. NELL.

CURRENT COLLECTOR FOR DYNAMO ELECTRIC MACHINES.

No. 600,088. Patented Mar. 1, 1898.

FIG. 3.



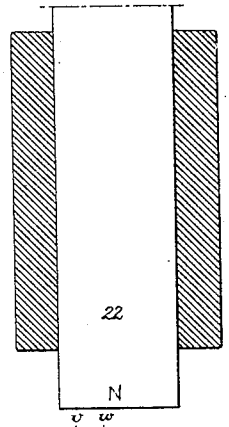


FIG. 4.

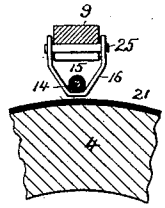


FIG. 1

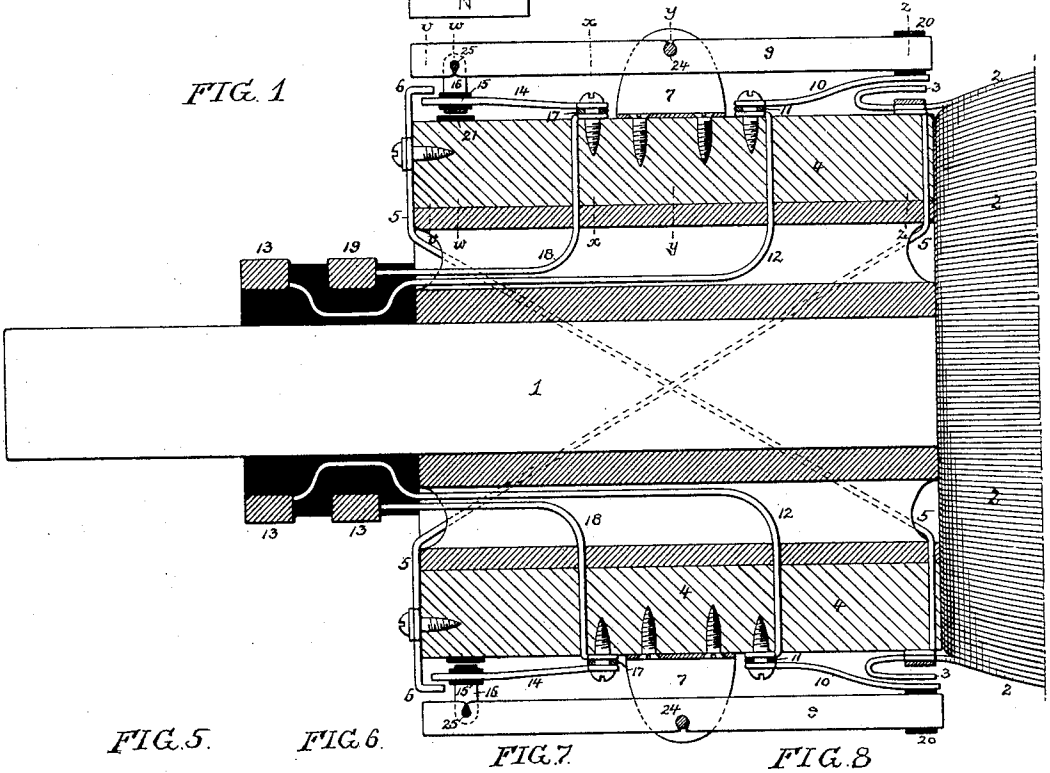


FIG. 5.

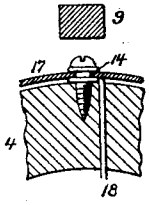


FIG. 6.

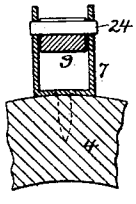


FIG. 7.

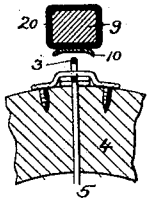


FIG. 8.

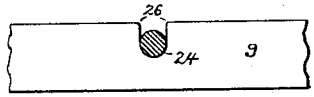
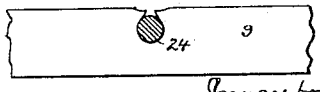


FIG. 9.



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(No Model.) 2 Sheets—Sheet 2.

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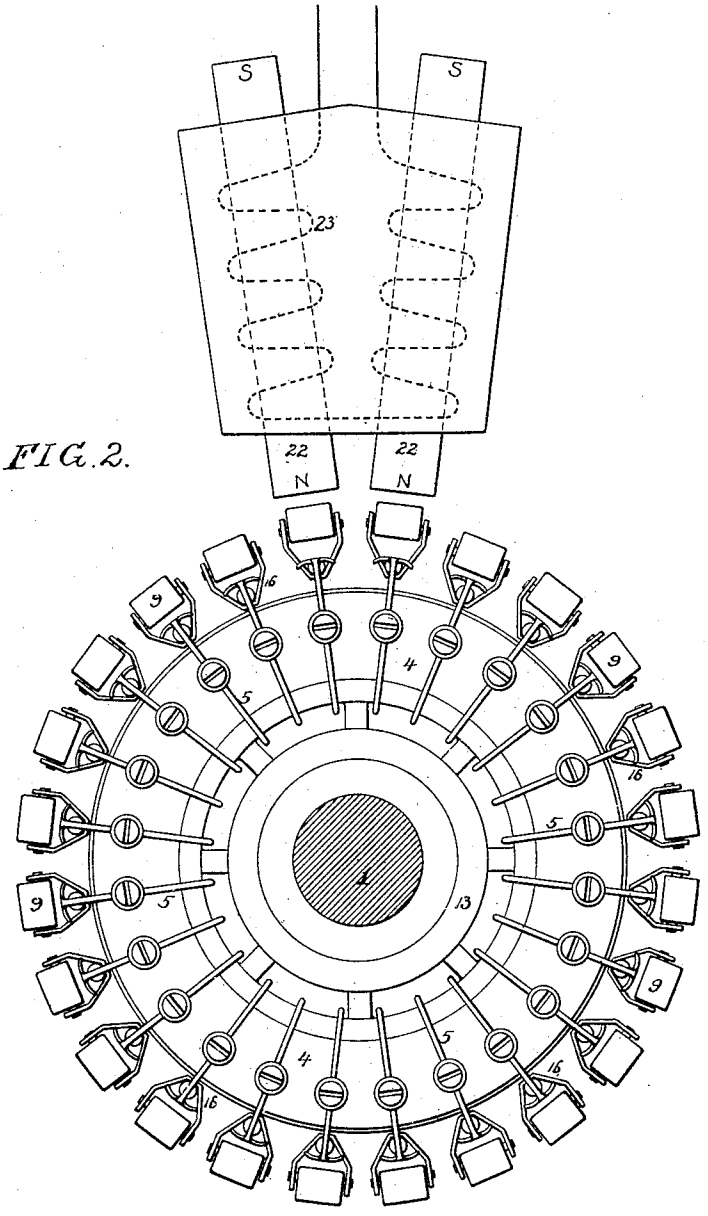
CURRENT COLLECTOR FOR DYNAMO ELECTRIC MACHINES.

No. 600,088. Patented Mar. 1, 1898.

FIG. 2.



Witnesses
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Charles DeGroot.

Inventor
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UNITED STATES PATENT OFFICE.

GEORGE WILLIAM NELL, OF PHILADELPHIA, PENNSYLVANIA.

CURRENT-COLLECTOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 600,088, dated March 1, 1898.

Application filed February 23, 1897. Serial No. 624,633. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WILLIAM NELL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Current-Collectors for Dynamo-Electric Machines, of which the following is a specification.

The object of my invention is to so construct a current-collector for dynamo-electric machines as to overcome the objections—such as friction, wear of parts, loss of current, difficulty of repair, &c.—which are incident to the commutators and brushes now generally employed in connection with this class of machinery. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings in which—

Figure 1 is a sectional view of sufficient of a dynamo-electric machine to illustrate a current-collector constructed in accordance with my invention. Fig. 2 is a view looking at the outer end of the current-collector. Fig. 3 is a transverse section on the line *v v*, Fig. 1. Fig. 4 is a transverse section on the line *w w*, Fig. 1. Fig. 5 is a transverse section on the line *x x*, Fig. 1. Fig. 6 is a transverse section on the line *y y*, Fig. 1. Fig. 7 is a transverse section on the line *z z*, Fig. 1; and Figs. 8 and 9 are enlarged views illustrating one of the features of my invention.

1 represents the shaft of the armature having wound upon the same a series of armature-coils 2, of which there may be as many as desired, each end of each coil having an exposed terminal 3 at the inner end of a hub 4, of wood or other available material, which is mounted upon the armature-shaft at the end of the armature. Each end of each coil is also connected by means of a cross-wire 5 to an exposed terminal 6 at the outer end of said hub and diametrically opposite the exposed terminal 3 of the armature-coil. To suitable yokes 7, mounted upon the hub 4, are hung levers 9, as many of these levers being employed as there are coils on the armature, so that the inner end of each lever projects over the exposed terminal 3 of one end of each armature-coil, while the outer end of said lever projects over the exposed terminal 6 of the opposite end of the said armature-coil. Thus, if the terminal 3 at the inner end of the lever represents the positive end of the armature-coil, the terminal 6 at the outer end of said lever will represent the negative end of said armature-coil.

Between each exposed terminal 3 at the inner end of the hub 4 and the inner end of the corresponding lever 9 is interposed the front end of a current-connector 10, the outer end of which is secured to a current-collecting ring 11, mounted upon the hub 4 and connected by means of a leading-wire 12 to a current-distributing ring 13, mounted upon but insulated from the shaft 1 of the armature.

The exposed outer terminal 6 of each of the armature-coils is bent inward over the hub 4, as shown in Fig. 1, and beneath this inwardly-bent terminal 6 projects the outer free end of a current-connector 14, which passes through an insulating-sleeve 15, carried by a loop 16, depending from the outer end of the lever 9, corresponding to said terminal 6, the inner end of said current-connector 14 being secured to a current-collecting ring 17, which is mounted upon the hub 4 and is in electrical connection, through a leading-wire 18, with a ring 19, mounted upon but insulated from the armature-shaft 1.

The current-connectors 10 have such resiliency that they will normally tend to press upward the inner ends of the levers 9, which will thus be removed from contact with the terminals 3 of the armature-coils. At the same time the connectors 14 by their resiliency will press downward the outer ends of the levers and withdraw the connectors 14 from contact with the terminal 6 of said coils.

The inner end of each lever 9 has a sleeve 20, of insulating material, in order to prevent electrical contact of said lever with the current-connector 10, and underneath the depending loop 16 of each of the current-connectors 14 is a pad 21, of rubber or other sound-deadening material, as shown in Figs. 1 and 4.

Above the outer ends of the levers 9 is mounted a magnet or magnets 22, which, preferably, are permanent magnets, but may be electromagnets which are excited by the current of a galvanic battery or dynamo.

In case permanent magnets are used these may also have wrappings of wire, as shown,

for instance, by dotted lines at 23 in Fig. 2, for the purpose of higher excitation, if necessary.

Each lever 9, or at least that part of each lever which passes beneath the magnet, should be of iron or steel in order that it may be readily attracted by said magnet.

In the present instance I have shown the magnet as composed of two bars 22, presenting similar poles at their inner ends, the levers 9 constituting swinging armatures for this magnet, so that as the outer end of each lever passes said magnet it will be attracted and lifted thereby, the inner end of the lever being simultaneously depressed. Hence the current-connectors 10 and 14, controlled by said lever, will be caused to make connection with the exposed terminals 3 and 6 of the armature-coil corresponding with the lever, so that through the medium of the said connectors the collecting-rings 11 and 17 and the leading wires 12 and 18 the ring 13 of the armature-shaft will be electrically connected with the terminal 3 of the armature-coil and the ring 19 will be electrically connected with the terminal 6 of said coil. Hence, supposing that the terminal 3 represents the positive end of the coil, the ring 13 will become the positive ring of the current-collector and the ring 19 will become the negative ring, said rings rotating in contact with the usual springs, brushes, or other conductors.

As the levers 9 successively pass under the magnet one or more of the levers will always be attracted thereby. Hence the armature-coils will be successively placed in connection with the rings 13 and 19.

The magnets 22 can be mounted in a rocker, so as to be adjusted across the ends of the levers 9 in the same manner and for the same purpose as commutator-brushes are now adjusted in respect to the neutral points of the armature.

In order to provide a simple means for securing to the levers 9 the pivot-pins 24, whereby they are hung to the brackets 7, and the pins 25, which carry the depending loops 16, I simply form in the edge of the lever a recess 26 with round bottom, as shown in Fig. 8, the pin being inserted into this recess, as shown in said Fig. 8, and the edges of the lever at the end of the recess being then calked or swaged in over the pin, as shown in Fig. 9, thus dispensing with expensive boring or drilling operations.

It will be understood that all of the connecting-wires are properly insulated, except at points where contacts have to be made.

Among the advantages incident to the use of my invention may be mentioned the almost complete absence of mechanical friction with attendant wear, in place of which there is but a slight magnetic friction. Hence a considerable saving in driving power is attained, and as no lubrication of the parts is required there is no accumulation of dirt, as when oil is used. The collector is also practically noiseless in its operation, and as the commuting of the current is done at the top of the collector both inspection and repair can be readily effected.

For large machines the hub 4 and the other parts of the collector may be enlarged in proportion without increasing the friction except against the air; but the greater draft of air is of benefit in keeping the parts of the collector cool.

In machines having four, six, eight, or more poles a single current-collector at the top of the hub will be sufficient to collect all of the current, and in this way saving is effected in driving power, in commutator-brushes, and attendance. In fact, my improved current-collector reduces the need of attendance and adjustment and renewal of parts to a minimum, thereby reducing both the initial cost of the machine and the cost of maintenance. Furthermore, all the generated current will be carried off without loss caused by short-circuiting or sparking, as the circuit is never opened and perfect contact is always made precisely at the right moment and at the right place. Hence the hurtful effects of self-induction in the field and armature coils caused by interrupting the circuit and manifested by sparking are entirely eliminated, as each armature-coil must deliver its current promptly when connection is made with its opposite terminals.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a current-collector for dynamo-electric machines, the combination of the armature-coils, current-distributers, one or more magnets located above the collector, levers rotating with the armature and controlled by said magnet or magnets, and contact devices operated by said levers, whereby the connection of the opposite ends of the armature-coils with the current-distributers will be effected at the proper time, and both connections will be made at the top of the collector.

2. In a current-collector for dynamo-electric machines, the combination of the armature-coils, one or more magnets, levers rotating with the armature and controlled by said magnet or magnets, connectors operated by said levers and moved thereby into contact with the terminals of the armature-coils, and collector-rings receiving the current from said connectors.

3. In a current-collector for dynamo-electric machines, the combination of the armature-coils, current-distributers, one or more magnets, levers rotating with the armature and controlled by said magnet or magnets, connectors operated by said levers and moved thereby into contact with the terminals of the armature-coils, collector-rings receiving the current from said connectors, and electrical connections between said collector-rings and the current-distributers.

4. In a current-collector for dynamo-elec-

tric machines, the combination of the armature-coils, current-distributers, one or more magnets, levers rotating with the armature and controlled by said magnet or magnets, connectors operated by said levers and moved thereby into contact with the terminals of the armature-coils, said connectors having such resiliency as normally to be retained out of contact with said terminals, and electrical connections between said connectors and the current-distributers.

5. In a current-collector for dynamo-electric machines, the combination of one or more magnets, levers rotating with the armature-shaft and successively brought under the influence of said magnet or magnets, armature-coils each having one terminal adjacent to one arm of the lever and the other terminal adjacent to the other arm of the lever, current-distributers, and contact devices operated by the levers.

6. In a current-collector for dynamo-electric machines, the combination of one or more magnets, levers rotating with the armature-shaft and carried successively under the influence of said magnet or magnets, armature-coils having at each end terminals adjacent to each end of one of said levers, current-distributers, and contact devices operated by said levers.

7. The combination of a lever having a recess in one side of the same, and a pin seated in said recess and retained therein by portions of the opposite walls of the recess swaged down upon the pin.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE WILLIAM NELL.

Witnesses:
JOS. H. KLEIN,
F. E. BECHTOLD.